

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Engineering of energy transportation processes</b>		Code <b>1010631361010632997</b>
Field of study <b>Transport</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>3 / 6</b>
Elective path/specialty <b>Engineering of Pipeline 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>2</b> Laboratory: <b>1</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>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  dr inż. Robert Kłosowiak email: robert.klosowiak@put.poznan.pl tel. 616652331 Faculty of Working Machines and Transportation ul. Piotrowo 3 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Knowledge of the issues of the basics of machine design and Machines as well as the basics of thermodynamics, fluid mechanics. [PRK4]
2	<b>Skills</b>	Construction of algorithms. The calculations in Excel. [PRK4]
3	<b>Social competencies</b>	Knowledge and understanding of the general technical energy processes [PRK4]
<b>Assumptions and objectives of the course:</b> Knowledge of pipeline transport of energy (heat). heat distribution network steam and water. Basis of design and the principles of construction and operation		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. has an extended and deep knowledge of mathematics useful for formulating and solving complex technical tasks concerning various means of transport - [T1A_W01 [P6S_WG]]		
2. has extended and in-depth knowledge of physics useful for formulating and solving selected technical tasks, in particular for correct modeling of real problems - [T1A_W02 [P6S_WG]]		
3. knows the basic techniques, methods and tools used in the process of solving transport tasks, mainly of an engineering nature - [T1A_W07 [P6S_WG]]		
<b>Skills:</b>		
1. is able to obtain information from various sources, including literature and databases, both in Polish and in English, appropriate to integrate them, make their interpretation and critical evaluation, draw conclusions, and fully justify the opinions they - [T1A_U01 [P6S_UW]]		
2. can properly plan and perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions from them - [T1A_U03 [P6S_UW]]		
3. can assess the computational complexity of algorithms and transport problems - [T1A_U08 [P6S_UW]]		
<b>Social competencies:</b>		
1. understands that in technology, knowledge and skills quickly become obsolete - [T1A_K01 [P6S_KK]]		
2. is aware of the importance of knowledge in solving engineering problems and knows examples and understands the reasons for malfunctioning transport systems that led to serious financial and social losses or to serious health and even life - [T1A_K02 [P6S_KK]]		

<b>Assessment methods of study outcomes</b>		
Exam		
<b>Course description</b>		
Pipeline transport of heat. Energy sources - hot water and steam. Heating pipes: construction and technical equipment supplies. Heat and power plants. Failures heating pipelines. Monitoring the operation of district heating pipelines. Telemetry. Flow losses in district heating pipelines. Heating pipe insulation. Dilation. Issues strength. Basics of building heating pipelines. Diagnostics operating district heating pipelines. Basic calculations of major and local design district heating pipelines. The economics of exploitation. Renovation of heating pipelines.		
<b>Basic bibliography:</b>		
<b>Additional bibliography:</b>		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. Participation in the lecture	30	
2. Consultation	2	
3. Preparing to pass	2	
4. Exam	2	
5. Participation in exercises	15	
6. consultations	2	
7. Preparing to pass	2	
8. Final test	1	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	100	2
Contact hours	50	1
Practical activities	50	1