

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Engineering of energy transportation processes		Code 1010631361010632997
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 6
Elective path/specialty Engineering of Pipeline Transport	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: 2 Laboratory: 1 Project/seminars: -		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		ECTS distribution (number and %)
Responsible for subject / lecturer:		
dr inż. Robert Kłosowiak email: robert.klosowiak@put.poznan.pl tel. 616652331 Faculty of Working Machines and Transportation ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Knowledge of the issues of the basics of machine design and Machines as well as the basics of thermodynamics, fluid mechanics.
2	Skills	Construction of algorithms. The calculations in Excel.
3	Social competencies	Knowledge and understanding of the general technical energy processes
Assumptions and objectives of the course:		
Knowledge of pipeline transport of energy (heat). heat distribution network steam and water. Basis of design and the principles of construction and operation		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has a detailed knowledge of the transport systems, including: the importance of transport in the socio-economic system of the country, region and city, forecasting the movement of people and goods - [K1A_W10] 2. Has a structured, theoretically founded knowledge in the area of transport infrastructure, including: transport networks, the overall characterization and classification of transport infrastructure - [K1A_W12] 3. Has a structured, theoretically founded knowledge in the field of transport means, general characteristics and classification of transportation machines, their functional properties and basic technical parameters - [K1A-W14]		
Skills:		
1. Is able to obtain information from the literature, internet, databases and other sources in Polish and English. Can integrate the information to interpret and learn from them, create and justify opinions - [K1A_U01] 2. Has the ability to self-educate using modern teaching tools such as remote lectures, webpages and databases, educational software, electronic editions - [K1A_U06]		
Social competencies:		
1. Understands the need and knows the possibilities of lifelong learning, knows the need for acquiring new knowledge for professional development - [K1A_K01] 2. Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment and responsibility for own decisions in short and long-term aspect - [K1A_K02] 3. Is able to identify and resolve the dilemmas associated with the profession, among others. problems at the technology/environment level - [K1A_K06]		

Assessment methods of study outcomes		
Exam		
Course description		
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.		
Basic bibliography:		
1. J. Szargut, A. Ziębik - Podstawy energetyki cieplnej, PWN, Warszawa 1998 2. Górzyński J.: Audyting Energetyczny obiektów przemysłowych. Biblioteka Fundacji Poszanowania Energii. Fundacja Poszanowania Energii. Warszawa 1995 3. Neryng A., Wojdalski J., Budny J., Krasowski E.: Energia i woda w przemyśle spożywczym. Wybrane zagadnienia. Wydawnictwa Naukowo-Techniczne. NT Warszawa 1990		
Additional bibliography:		
1. Kwietniewski M., Gębski W., Wronowski N.: Monitorowanie sieci wodociągowych i kanalizacyjnych. s Monografie ? Wodociągi i Kanalizacja nr 10. Polskie Zrzeszenie Inżynierów i Techników Sanitarnych. Warszawa 2005		
Result of average student's workload		
Activity	Time (working hours)	
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	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	50	2
Practical activities	50	2