

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Transport of materials		Code 1010621271010633831
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 7
Elective path/specialty Aircraft 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: 1 Laboratory: - Project/seminars: -		No. of credits 2
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		ECTS distribution (number and %) 2 100%
Responsible for subject / lecturer: dr inż. Ryszard Piątkowski email: ryszard.piatkowski@put.poznan.pl tel. 616652214 Faculty of Working Machines and Transport ul. Piotrowo 3 60-965 Poznań		Responsible for subject / lecturer: mgr inż. Łukasz Semkło email: lukasz.semklo@put.poznan.pl tel. 616652213 Faculty of Working Machines and Transport ul. Piotrowo 3 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of thermodynamics and fluid mechanics, general mechanics, Fundamentals of mechanical engineering (science of mechanics)
2	Skills	The calculation of transmissions various types of media in pipeline installations.
3	Social competencies	Working in an interdisciplinary team. Ability to lead a team and increased knowledge of team.
Assumptions and objectives of the course: Knowing some of the theoretical and practical aspects of flow and transport of the media exploitation problems pumps, fans, blowers and compressors. Knowing simpler algorithms based on the learned knowledge and known measured links		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has a structured, theoretically founded knowledge in the field of operations research, including: discrete issues - problems of storage and sharing of resources, issues of transportation, graphs and networks ? suboptimal coloring, network flows, assignments, issues of mass service - priorities, group service - [K2A-W08]		
2. Has a detailed knowledge of the transport systems modeling, models of transport systems, the distribution of streams in transport networks - [K2A-W10]		
3. 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]		
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 - [K2A_U01]		
2. Has the preparation required in industrial environment, knows safety rules for the job, is able to use for technical standards on unification, safety and recycling of machinery and equipment - [K2A_U08]		
Social competencies:		
1. 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 - [K2A_K02]		
2. Has a sense of responsibility for one?s own work and is willing to comply with the principles of teamwork and taking responsibility for collaborative tasks - [K2A_K04]		
3. Is able to identify and resolve the dilemmas associated with the profession, among others. problems at the technology/environment level - [K2A_K06]		

Assessment methods of study outcomes		
Exam, final test		
Course description		
<p>Media: water, gas, hot water (steam) and electricity and media technology. Today's energy issues. Bill of technical and economic legal regulations. Physico-chemical properties of the so-called. media. Basic engineering for the transport of media. Losses in piping systems and turbomachinery channels. Loss of internal and external leaks. Description of the degree of movement of the machine and the entire machine. The description in pipes and machinery transport of media. The concept of efficiency measures the degree of perfection of the media transport and machinery. Selected aspects of thermodynamic and flow. Basic equations of fluid flow machines. Indicators specific machines. Variable conditions. The aging of piping components and machinery. Monitoring of the plant and machinery. The specificity of the media pipeline transport problems. Examples of failure. Selected aspects of repair and renovation of turbomachinery</p>		
Basic bibliography:		
<p>1. Piątkowski R.; Materiały niepublikowane, udostępnione (na prawach autorskich) 2. Gnutek Zb., Kordylewski W.; Maszynoznawstwo energetyczne. Politechnika Wrocławska, Wrocław 1994</p>		
Additional bibliography:		
<p>1. Ciałkowski M.: Mechanika płynów. Wydawnictwo Politechniki Poznańskiej. Poznań 2009 2. Domański R., Jaworski M., Rebow M., Kołtyś J: Wybrane zagadnienia z termodynamiki w ujęciu komputerowym. Wydawnictwo Naukowe PWN. Warszawa 2000</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in the lecture	15	
2. Consultation	2	
3. Preparing to pass	4	
4. Exam	2	
5. Participation in exercises	15	
6. consultations	2	
7. Preparing to pass	4	
8. Final test	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	46	2
Contact hours	38	2
Practical activities	0	0